



# **COLLISION INDUSTRY** CONFERENCE

## Emerging Technologies & Insurer Relations Committees – Impact of Calibrations

Presented by:

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Jack Rozint, Mitchell  
Matthew McDonnell, Big Sky Collision  
Chuck Olsen, AirPro  
Eric Newell, asTech  
Darrell Amberson, LaMettry's  
Clint Marlow, Allstate

# Agenda

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## **Brief Overview of Calibrations & Vehicle Tests**

Jack Rozint Mitchell

## **Road Tests – Why they're important, what's involved?**

Matthew McDonnell – Big Sky Collision

## **When is a calibration needed?**

Eric Newell, asTech/Repairify

## **What is needed to perform an ADAS calibration?**

Chuck Olsen, AirPro Diagnostics

## **Real world learning from doing ADAS calibration in-house**

Darrell Amberson, LaMettry's Collision



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# Overview of Calibrations

*Jack Rozint*

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# Calibrations & Tests | Four Types

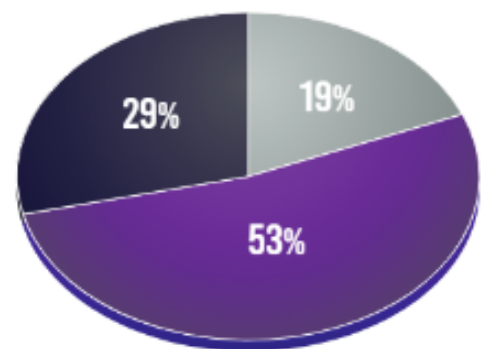
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- **Post Repair Road Tests**
  - Check driving performance, complete drive cycle, self-calibration
- **Basic Calibrations**
  - Zero point, steering angle sensor, seat weight calibration
- **Dynamic ADAS Calibrations**
  - Require driving during test with scan tool connected
- **Static ADAS Calibrations**
  - Require OE specific targets, specialized scan tools, large work area

**APPROXIMATELY WHAT PERCENTAGE OF INSURANCE COMPANIES ARE COMPENSATING YOU FOR THESE SCANS?**



**WHAT DO YOU CHARGE FOR YOUR SCANS?**



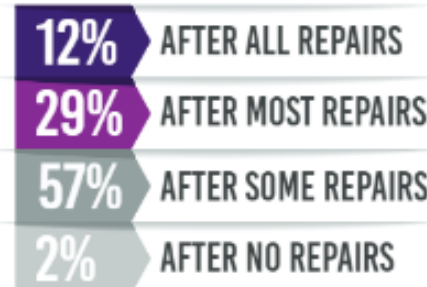
- LESS THAN \$50 PER SCAN
- BETWEEN \$50 AND \$99 A SCAN
- \$100 OR MORE PER SCAN



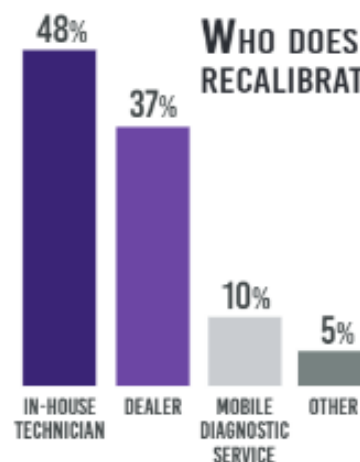
**YES 48% NO 52%**

**HAVE YOU OR ANYONE ON YOUR STAFF TAKEN DIAGNOSTIC TRAINING WITHIN THE PAST YEAR?**

**ARE YOU DOING RECALIBRATIONS?**



**WHO DOES YOUR RECALIBRATIONS?**



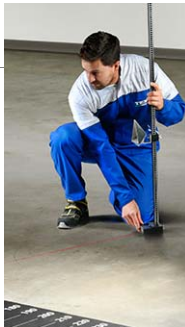
# Dynamic ADAS Calibration | Requirements

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- **OEM Scan device or specialized aftermarket tool in the vehicle**
  - Typically involves a driver and a technician passenger
  - <https://rts.i-car.com/collision-repair-news/video-exclusive-dynamic-calibration-with-bosch-s-steve-zack.html>
- **Test runs with tool connected directly while driving**
  - Maintain certain speed range for 5 minutes or more
  - Straight road with painted center line and side line
  - Cannot be done during rain, snow, night hours
  - Traffic or stops require pause or complete restart of test
- **After windshield replacement or anything impacting the front camera system including rear view mirror, camera mounted in grill, etc.**

# Static ADAS Calibration | Requirements

- **Targets systems** for front lane departure (Honda, Toyota)
  - Involves OE specific targets, specialized scan tool, laser measuring, large work area
- **Reflector** for blind spot radar calibration for ultrasonic radar (Honda, Toyota, Kia)
  - Involves a metal reflector cone, a laser and a goniometer jig
- All Around Calibration - **360° cameras and Doppler** devices (Audi, VW)
  - Involves aluminum structure, magnetic panels, laser distance meters
- IR Calibration Target for Pedestrian **Infrared** Camera Detection (BMW 7)
  - Simulates a warm body in front of the vehicle
- Equipment, facility and training requirements are very high
- It's possible the dealership may not have the equipment/training
- There is typically not a warranty time or standard price



# NJ Repair Facility Rebrands to: ADAS Calibration Center

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Fender Bender July 11, 2019

“We’re basically IT professionals; everything is laptop-based, cloud-based, these cars are basically rolling computers,” Bigelow says.

The field has become very analytical and technical, he says. Ten years ago, if a car had two computers in it, it was considered advanced. Now, Bigelow says that most cars he sees come in have over 200.

“Ninety percent of what we do is in our heads, and we only work 10 percent with our hands, where before it was the other way around,” he says.

Average monthly car count of just over 300 and an annual revenue of \$1.8 million







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# Test Drives

*Matthew McDonnell*

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# Test Drives

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## Why do we need to test drive a vehicle?

- There are systems that do not engage until a certain speed limit or drive cycle (mileage) or temperature is achieved such as adaptive cruise control or cooling systems.
- There are sounds and performances variations that need to have a human reaction to detect such as wind noise, alignment, flat spots on tires and vibrations or sounds.
- Vehicles are intended to be driven, so test driving the vehicle is a vital part of the repair process.
- Because the OEM repair procedures may indicate that we need to process that operations.

# 2017 Ford F-150

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Camera alignment is required for the lane keeping alert and lane keeping aid to function correctly. The procedure is initiated using the diagnostic scan tool and requires about 10 minutes of driving above 40 mph (64 km/h) to complete. NOTE: The alignment completion is indicated on the diagnostic scan tool. If the alignment is unsuccessful, check the interior mirror for proper installation. NOTE: The FRONT CAMERA MALFUNCTION - SERVICE REQUIRED message in the IPC disappears when the system is aligned. The IPMA camera alignment procedure should be performed when any of the following occur:

- Windshield replacement
  - Change in tire size
  - Suspension repair or alignment
  - Front air bag deployment
  - Interior mirror replacement
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# Honda TPMS

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NOTE: Make sure the tire pressure is properly adjusted to the specified tire pressure listed on the doorjamb label before doing the TPMS calibration. The calibration begins when the calibration is selected through the center display. The calibration is completed after driving in an ideal driving condition (22 to 65 mph (35 to 105 km/h), driving steadily without much acceleration or deceleration) for about 20 minutes. Full functionality of the system cannot be performed properly if the calibration is not completed. Do the TPMS calibration after doing the following items.

- Adjust the tire pressure.
- Rotating the tires.
- Replacing the tire(s).
- Update the VSA modulator-control unit.
- Replace the VSA modulator-control unit



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When is a calibration needed?

*Eric Newell*

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# When is a Calibration Needed?

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- Any time the module or component is manipulated outside original factory settings
  - Remove and Installs
  - Replacements
  - Adjustments
  - Damage

# Indicators of System Issues

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- Often there will be no indicator light representing a mis-aligned or uncalibrated component.
- Pre/Post Scan may or may NOT indicate the need for re-calibration.
- Only OEM repair procedures can tell you when/if a calibration is needed.

# Does vehicle HAVE an ADAS System?

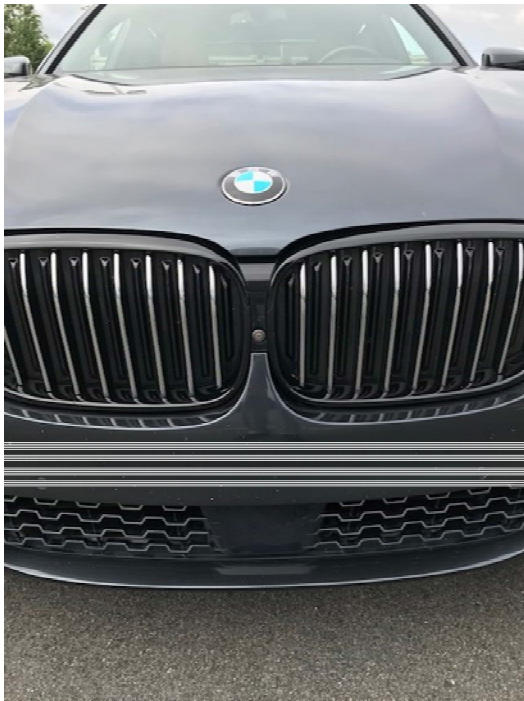
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- How can you as a repairer identify these systems?
  - Diagnose vehicle via a remote service using OEM tools/software
    - Vehicle is connected to the OEM tool providing most up to date information
    - A remote expert has ability to identify modules and inform customer of calibration needs or repair procedures through repair recommendations
  - Diagnose vehicle utilizing the manufacturer tool with a trained technician
  - Locate visual indicators of ADAS systems



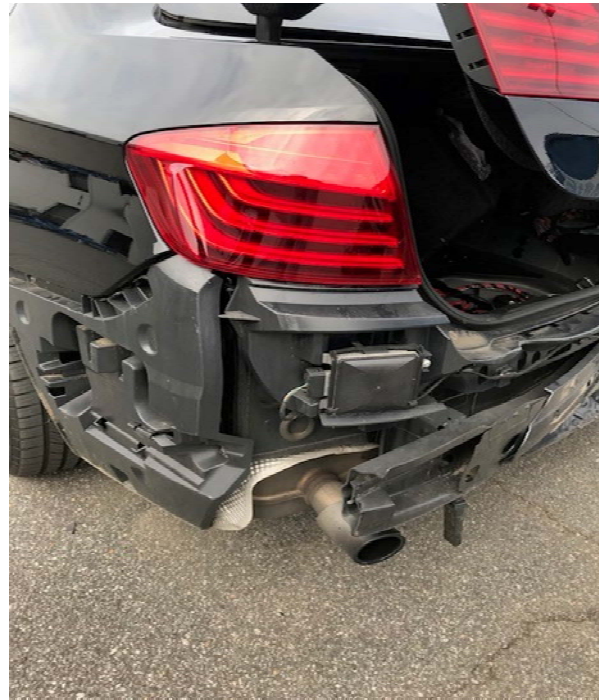
# Visual Indicators of Possible Calibration

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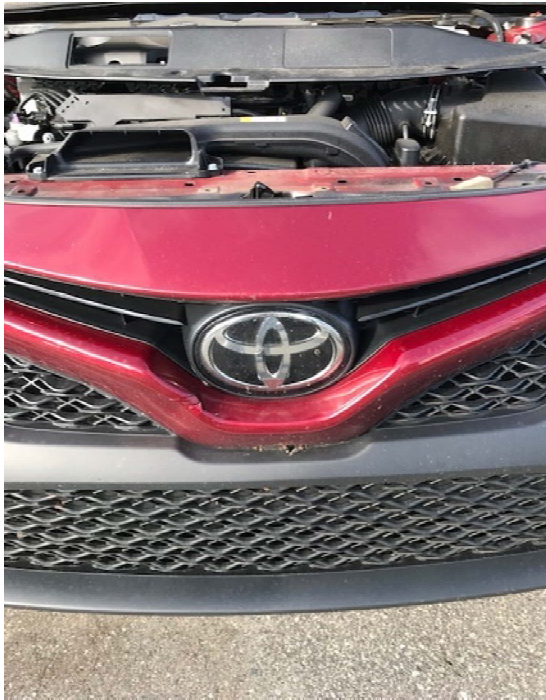
# Visual Indicators of Possible Calibration

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# Visual Indicators of Possible Calibration

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# OEM Example:



## WHEN AIMING IS REQUIRED

Use the table below to determine when aiming is required.

System	When to Aim	Notes
Millimeter Wave Radar	Millimeter wave radar unit was removed and installed.	
	Millimeter wave radar unit was replaced.	Always order a new replacement radar unit using the VIN.
	After a collision repair that would require at least a front bumper fascia repair within 300 mm of the millimeter wave radar unit.	
	After a collision repair requiring a structural body repair.	
	After a Supplemental Restraint System (SRS) deployment.	
	After doing a wheel alignment.	Wheel alignments done after a collision or when the alignment was severely out of specification.
	If the following DTCs are set: <ul style="list-style-type: none"> <li>• <b>P2583-54</b> (millimeter wave radar aiming incomplete)</li> <li>• <b>P2583-64</b> (millimeter wave radar aiming error)</li> <li>• <b>P2583-97</b> (dust or dirt on the millimeter wave radar)</li> </ul>	<ul style="list-style-type: none"> <li>• You must follow the DTC troubleshooting procedure first, and only do the aiming procedure when instructed.</li> <li>• Other DTCs indicated must be corrected prior to aiming; otherwise, the aiming may fail.</li> </ul>



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What is required to recalibrate?

*Chuck Olsen*

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# General Scanning Requirements

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## ➤ PRE-SCAN (PRE-REPAIR SCAN) (INSPECTION SCAN) (HEALTH CHECK)

- Performed before repairs or disassembly begins, part of repair planning or blue printing, Purpose is to ***identify areas of concern*** within the vehicles computer networks, components and safety systems. Includes ***basic code definition and assessing possible relationship of faults to vehicle damage***, Document description of diagnostic trouble codes found.

## ➤ POST-SCAN (POST-REPAIR SCAN) (COMPLETION SCAN) (HEALTH CHECK)

- Performed when vehicle is completely re-assembled before final QC. ***All systems checked with a scan tool*** and verification that ***all system current codes have been cleared or have been addressed***. Dash Warning lamps or messages are clear or have been addressed.

# ADAS Requirements

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**ADAS calibrations are procedures separate and apart from post repair scans and basic calibrations (Steering angle, Yaw, TPMS, etc.)**

- Successful pre-post-scanning and basic calibration program in place
- Ability to inspect, identify, repair ADAS components and related damages
- Ability to identify repairs that call for ADAS calibration or functionality checks
- Ability to complete pre-requisite procedures to prepare a vehicle for ADAS calibration
- Identify a source to have ADAS calibration completed with documentation

# ADAS Systems

ACC – Adaptive Cruise Control

AEB – Automatic Emergency Braking

AFLS – Adaptive Front Lighting System

AHBC – Adaptive High Beam Control

ALC – Adaptive Light Control

ANV – Automotive Night Vision

APS – Automatic Parking System

BSD – Blind Spot Detection,

BSM – Blind Spot Monitoring,

BSW – Blind Spot Warning

BOP – Back-over Protection

CAS – Collision Avoidance System

CDW – Collision Detection Warning

CIB – Crash Imminent Brakin

CMS – Camera Monitor System

CTA – Cross-Traffic Alert

DBS - Dynamic Brake Support

DDW – Drowsy Driver Warning,

DFW – Driver Fatigue Warning,

DDD – Driver Drowsiness Detection,

DMS – Driver Monitoring System

EVWS – Electric Vehicle Warning Sound

EDA – Emergency Driver Assistant

FCW – Forward Collision Warning,

FCWS – Forward Collision Warning System

FCA – Forward Collision Avoidance

GFHB – Glare-free High Beam

HLA – Head Lamp Assist

See also Glare-free High Beam.

HUD – Head-up-Display

HDC – Hill Descent Control

ISA – Intelligent Speed Adaptation

IHBC – Intelligent High Beam Control

IPAS – Intelligent Parking Assist System

LA – Lighting Automation

LCA – Lane Change Assist

LCA – Lane Centering Assist

LD – Lane Detection

LDW – Lane Departure Warning,

LDWS Lane Departure Warning System

LKA – Lane Keeping Assist

MOD – Moving Object Detection

NVA – Night View Assist

OC – Online Calibration

OD – Object Detection

OSD – Optical Surface DirtPA – Parking Assistance

PD – Pedestrian Detection,

PDS – Pedestrian Detection System

PAEB – Pedestrian Automatic Emergency Braking

PLD – Parking Line Detection

PSMD – Parking Slot Marking Detection

RCTA – Rear Cross-Traffic Alert

RVC – Rear view camera

SVC – Surround View Camera

See also Surround View Park Assist

SVPA – Surround View Park Assist

See also Surround View Camera

SAD – Semi-Autonomous Driving

TJA – Traffic Jam Assist

TSR – Traffic Sign Recognition

TLR – Traffic Light Recognition

TA – Turning assistant

UPA – Ultrasonic Park Assist

WWDW – Wrong-Way Driving Warning

WWDA – Wrong-Way Driving Alert



# ADAS Sensors and Inputs

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- Steering angle sensor
- Forward Facing camera(s)
- Side view camera(s)
- Rear view camera(s)
- Forward facing radar(s)
- Front ultrasonic sensors
- Rear ultrasonic sensors
- Rear/Side facing Radar(s)
- Brake pedal position
- Accelerator position sensor
- Throttle position sensor
- Vehicle speed sensor
- Wheel speed sensors
- Transmission shifter position input
- Turn signal input
- Cruise control input
- Ambient light sensor
- Option settings (on/off switches)
- Multi directional sensor(s)
- Vehicle communication network
- ABS data
- Engine data
- Transmission data
- Body control data

# ADAS Calibration Requirements

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## **Experts at pre-post-scanning and basic calibrations**

- Identify vehicle makes/models/systems you will be calibrating
- Determine calibration types for each make/model/system
- Determine and acquire peripheral equipment and tools needed for each make
- Determine and prepare space requirements, environment and test-drive route for each calibration type
- Determine documentation method of successfully completed ADAS Calibrations

# ADAS Calibration Requirements

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## Calibration Center at shop

- Static Calibration area is required to be well lit with no shadows.
- Area should be free of debris and equipment. No signage containing patterns.
- Suggested Minimum Space requirements: 30'X50'
- Floor should be level and non-reflective (Use flat grey paint if needed)
- Walls should be free of reflective materials (Preferably painted flat white)
- It is imperative that all codes are clear with any required programming and base system calibrations performed before performing an ADAS Calibration
- All Calibrations to be completed after final assembly and clean-up have been performed.



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# Real World Learning from In-House Calibration

*Darrell Amberson*

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# Requirements for Performing Calibrations In-House

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## **Space:**

- 60'x40' will accommodate virtually all static calibrations
- Most static calibrations can be done in less space
- A few calibrations can be done on a mobile basis, such as in a shop aisle

## **Tools:**

- A variety of scan tools
- Calibration 'station'
- Miscellaneous calibration targets
- Miscellaneous tools for checking and physically aligning components such as radar units and blind spot sensors

# Requirements for Performing Calibrations In-House

## **Technicians:**

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- Computer literate, motivated and enthused by new technologies, able to self manage, willing to read and learn, at least some mechanical and geometric aptitude.
- Some diagnosticians can be good candidates
- This is a new role, different from all other collision and mechanical roles

## **Training:**

- I-CAR, AMI, OEM, and many aftermarket supplier and education entities are a great starting point
- Mentoring
- Reading vehicle manufacturer repair procedures and operation manuals
- Must become familiar with the driving characteristics of various ADAS systems
- Most learning takes place through practical application, similar to learning to use a personal computer or iPhone

# LaMettry's Collision

- Regional MSO, 9 locations, repairing about 1200 vehicles per month, many OE certifications and dealership relationships.
- Performing 3-5 calibrations per week in November.
- Currently performing 7-10 calibrations per day.
- Currently 2 calibration stations, in different geographic locations.
- Adding a 3<sup>rd</sup> calibration site.
- Mobile techs performing scans and some calibrations on-site.
- Mechanical and ADAS work is within a separate company. Mechanical management system and billing.

## **Lessons learned:**

- In regards to pricing, it's the 'wild west'.
- Pricing is starting to normalize and will more so in a year or so.
- It can be a profit center.
- It can complement a collision business.
- Competition is increasing. Many getting into the business.
- It's not hard, its just different.
- Many dealerships don't engage in ADAS and lack knowledge.
- Finding vehicle manufacturer repair procedures can be a challenge.
- Finding vehicle manufacturer "when a calibration is needed" is a bigger challenge.
- Road tests, specific for ADAS function, are critical.



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## Closing Thoughts

*Clint Marlow*

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